The Scientific Review,

AND

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SUBJECT MATTER INDEX OF APPLICATIONS FOR PATENTS.

March 21st to April 20th inclusive.

The following Index gives first the class, then the name of the Inventor. In this list (com.) means Invention communicated from abroad. Further information as to the progress of these Patents by Notice to Proceed, Sealing, and Specifying, can be obtained at the Office, 21, Cockspur Street, Charing-cross.

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AN EXPENSIVE FOX.—Six months ago a party of hunters tried to smoke out a fox that had taken refuge in a hole ten miles west of Somerset, Ky. In so doing they set fire to a bed of coal which has been burning ever since.—*Scientific American.*

Reviews.

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1. An elementary text-book on structural and physiological botany—preferably Dr. Hooker's *Primer of Botany*, published by Messrs. Macmillan.

2. A good penknife, scalpel, or razor. When cutting sections, see that the instrument is *sharp, clean, and moist*. Always keep a glass of water on the work-table.

3. A few dissecting needles. These can be easily made by mounting common sewing needles in pieces of twigs, or in ordinary pen or camel-hair pencilholders. When not in use, they should be kept stuck in corks.

4. A cutting needle. This may be made from a good crochet needle, by breaking off the notch or hook, and flattening the point of the needle for about half an inch on opposite sides, by grinding it on a wet freestone, and finishing off on an oiled one.

5. A pair of small forceps.

6. An assortment of pins.

7. A dissecting microscope. This may be constructed by mounting an ordinary lens, free to slide on a vertical rod over a convenient stage, so that both hands may be free when dissecting anything under the lens. Mr. John Browning, optician, of 63, Strand, has, at my suggestion, recently introduced a "botanical dissecting microscope" at a very low price. It is similar in arrangement and design to one I constructed for use in my own classes. It is very convenient, and fitted with all necessary appliances.

8. A sketch book. Sketches should always be made, as afterwards directed, of any characteristic points of structure, but especially of any dissections of parts of the flower. As models of what sketches like these ought to be, the student is referred to *Floral Dissections, illustrative of Typical Natural Orders*, lithographed by the Rev. Geo. Henslow, and published by Mr. Stanford. The sketches made by the student should, however, be drawn on a much larger scale.

9. Pencils (black and coloured). After making the sketches above referred to, the different organs, or distinct parts of organs, should be diagrammatically coloured. When practicable, the corresponding part in every flower should always be distinguished by the same colour. Half-a-dozen different colours, at least, will be found necessary. Should any difficulty be experienced in obtaining these pencils, they can be supplied by the publishers.

When the selected type has been fully worked out according to the instructions, then as many of the other plants as possible which are mentioned in the list under each natural order should be found, examined, sketched, and described. The plants, with dissections, can afterwards be dried under pressure between old newspaper sheets, and eventually mounted (on cards or sheets of foolscap), labelled, and preserved. Amongst subjects treated of are—the meadow buttercup, the wallflower, the greater stitchwort, the sweet-pea, the bramble, the cow parsnip or hogweed, the dandelion, the great snapdragon, the white deadnettle, the white goosefoot, the common hazel, the spotted orchis, the wild hyacinth or bluebell, the common cotton-sedge, the common wheat, Synopsis of the preceding fifteen natural orders, appendix, and an index to plants referred to close the work, which is one well fitted for the use of students of botany.

BAUERMAN'S MINERALOGY.

"Text-book of Systematic Mineralogy." By HILARY BAUERMAN, F.G.S., Associate Royal School of Mines. London, Longmans, Green, and Co. 1881.

IN preparing this text-book, two main objects have, it is stated, been kept in view: first, that it should form a useful guide to students desirous of acquiring a general knowledge of the subject: and secondly, that it should serve as an elementary introduction to larger text-books, such as those of Dana, Miller, Descloizeaux, and Schrauf, an acquaintance with which is essential to those who wish to familiarise themselves with the higher branches of the subject. For this purpose, the treatment adopted has been as general as possible, the descriptions of the crystalline forms dealing only with their symmetry and general geometrical properties, without entering into the question of the practical calculation and determination of individual examples, which would have increased its bulk beyond admissible proportions. In this part of the text, the methods followed have been mainly those of Groth's admirable treatise on "Physical Crystallography," except that the plan there adopted of considering the physical structure of crystals before their geometrical properties has been abandoned in favour of the less logical, though more familiar, one of giving precedence to the latter. The optical properties of crystals have been considered at somewhat greater length than is usual in rudimentary books, on account of the great and increasing use made of this branch of investigation.

Upon similar utilitarian considerations a mixed system of notation has been adopted in the crystallographic part, the forms being designated in the text by their symbols according to Naumann, while the notation of their faces is by indices on Miller's system. As a matter of personal preference, the latter system would have been adopted exclusively; but, having regard to the fact that the former is used much more extensively than any other system, both in text-books and in original memoirs, familiarity with its use is very desirable for students.

In the hexagonal system, the Bravais-Miller notation by indices on four axes has been adopted, as showing most clearly the relation between it and the tetragonal system.

In the chemical portion of the volume the classification followed is that of the second edition of Rammelsberg's "Handbuch der Mineral-Chemie," as being the standard modern authority upon the chemistry of minerals.

The systematic part having been extended somewhat more than was originally intended, it has been found impossible to include physiography, or general descriptive mineralogy, in the same volume, without deviating too widely from the plan of the series. This will therefore be issued as a companion volume.

The valuable assistance and advice received from many friends is gratefully acknowledged, and the writer mentions particularly the services rendered by the editor of the series, Mr. Merrifield, who has made several important additions to the text, Mr. R. T. Glazebrook, of Trinity College, Cambridge, and Mr. F. W. Rudler, who has passed the later sheets through the press during the writer's absence abroad.

The various chapters of the work refer to the general principles of form, cubic system, hexagonal system, tetragonal system, rhombic system, oblique system, triclinic system, compound or multiple crystals, measurement and representation of crystals, physical properties of minerals—cleavage, hardness, specific gravity, optical properties of minerals, thermal and electrical properties of minerals, chemical properties of minerals, relation of form to chemical composition, association and distribution of minerals, and index.

THREE HUNDRED YEARS HENCE.

"Three Hundred Years Hence; or A Voice from Posterity." By WILLIAM DELISLE HAY, author of "The Doom of the Great City." London: Newman & Co., 43, Hart Street, Bloomsbury, W.C. 1881.

THIS is an extraordinary production, well fitted to be the companion of the author's former work, "The Doom of the Great City" (*i.e.* London), which was to be overthrown by Fog, and other calamities.

Some of the scientific practicalities of three hundred years hence are sufficiently startling, and some are, to our mind, so capable of some measure of accomplishment by much more proximate working than 300 years, that we wish our author had made 100 years his term, as then these matters would have had some interest for the sons and daughters of those now living.

The work assumes the form of printed lectures of Professor Patrick Blount Macpherson, Meister of History, Coll. Univ. City of Londinova, State of Atlantis, delivered December A.D. 2180. The Professor begins with a comparison between 1880 and and 2180, remarking on the condition of man in 1880 and foolish blindness of the nineteenth century to predications of the future, and he discusses *inter alia* the rise of socialism; what is it; its early struggles; correlation of socialism and increase of population; source of the new political force; the great powers; their hostility; Britain; the Irish rebellion; the land question; party-government; civil war; disruption of the British Empire and extinction of its power; the Balkan Peninsula: relations of the powers to one another; the great wars; their continuance.

The Social Revolution is the next subject of consideration, and embraces progress of improvements in war-machinery, past, present, and future; American ingenuity; invention and perfection of new guns and projectiles; description of the subterranean torpedo; the electric shell, &c.; destructiveness of the new engines; relinquishment of war among the nations; dawn of peace; pre-eminent position of America; development of socialism; its universal spread and power; disappearance of militarism; fall of the thrones of Europe; the Great Social Revolution; the federation scheme: freedom, brotherhood, and progress; condition of the civilised races; progress of knowledge.

The Century of Peace and the Triumphs of Science are then reviewed as comprising varieties of locomotion; on land; on the sea; under the sea; within the earth; in the air; discovery of the Basilic force; what it is; its effect on science; submarine aquatics; the old diving-dress and diving-bell; modern aquatic armour; the property of repulsion; submarine ships; a voyage to the ocean depths; description of the vessel; submarine industries; submarine harbours; the submarine town of Krakenburgh; the professor's visit to it: description of it; its comforts and beauties; visit to an algoculturist's farm; a picnic at the bottom of the sea.

The Conquest of the Earth:—Subterrane locomotion; early attempts at penetration; advanced engineering; fertilisation of deserts by subterrane irrigation; nineteenth-century geology; internal heat; the laws of force; the heat-conductor; Iceland and

Greenland; Arctic and Antarctic agriculture; Basilico-magnetism the means of new power; how the twenty-second century traverses the solid earth; the "earth-explorer;" principles of its action; geological discoveries; the true conditions of internal heat; volcanic action; compression at 100 miles depth; the cavities of the earth's crust; how explored and made habitable; the interior states; the professor's visit to a city fifty miles underground; the start through the Atalantean Gate; the journey down; the state of Sonoria; the City of Argenta.

The Conquest of the Air:—Early aspirings after aërial locomotion; ideas on the subject in the nineteenth century; artificial wings; ballooning; its origin and development; the false principle of aërostation attraction; of gravitation; nineteenth century notions of it: twenty-second century knowledge of it; some results of scientific research; Exposé of ancient errors; light, heat, and motion; a digression on fluorescence; ballooning during the century of peace; lucegen gas; lucegenostat; the aerial *point d'appui*; aerial navigation; magnetism; the true principle of aeromotion; its effects; modern aeromotives; the alamotor; the spiralomotor; the zodiamotor; description of each; atmospheric discoveries; summary.

The Fate of the Inferior Races.

The Exodus from the Land:—Africa and China after the extermination; The population question; Opinions and theories; the land question; a proposal to build on the sea; experiment; success; town of Aqumarina; a digression about agriculture; the plan of supermarine residence; state of the popular mind; Œcumenic wisdom; the Terrane Exodus Decree; programme of the Exodus and its execution; the city of Londinova; composition of koralla; how the foundations of a city of the sea are laid; the builders' equipment and mode of work, the city vaults and their purposes; heat, light, water, sewage; a nineteenth-centenarian's presumed visit to Londinova; the levee; the docks; the grand esplanade; houses and shops; architecture and antiquities; the sphere of modern city life; up in the air; air-front of houses; the modern front-door; extent and variety of aerial traffic; visit to a modern bazaar; dwellings of the poorer classes; visit to a "west-end" mansion: its splendid luxury; magnificence and utility; citizens; in the university.

The Empire of Humanity.

Like all works of this kind there is much nonsense mixed up with much deep philosophy.

SURGERY BY THE ELECTRIC LIGHT.—Dr. Berkeley Hill, recently operated for fistula, in University College, London, while the passage was lighted up by Coxeter's application of the glowing platinum wire. The apparatus consisted of a fine wire twisted into a knot, and through this knot was sent a continuous galvanic current strong enough to maintain the wire at a white heat. The wire was inclosed in a glass chamber, which was itself also inclosed in another glass cover. Through the space between the glasses a current of water was allowed to flow, in order to preserve a low temperature around the light, and a strong light was maintained for over an hour close to the margins of the fissure.

A SOCIETY FOR PREVENTING STREET ACCIDENTS, 47, Pall Mall, S.W., proposes to take action to prevent loss of life from our street traffic. We wish this organisation success, but we hope they will not stop at the erroneous conclusion that the carriages do not drive so inconsiderately through such main thoroughfares as Charing-cross as to place pedestrians in peril. We say let the police be looked after in this matter, for in our experience they take no care whatever to prevent pedestrians being knocked down, being much too engrossed by the regulation of vehicular traffic to care for their safety.

THE PATENT LAW AMENDMENT BILL.

THE proceedings at the conference on Patent Law Amendment held on the 7th April, 1881, under the presidency of SIR ANTONIO BRADY, President of the Inventors' Institute, commenced by Mr. F. W. Campin, Barrister-at-Law, the Secretary of the Institute, reading the notice calling the meeting. He stated that although such notice referred simply to the Bill now before the House of Commons, yet it would be open to any one present to make any remarks on the question of Patent Law Reform in general.

The PRESIDENT then spoke as to the prosperity of the country being dependent on the efforts of Inventors, and in doing so remarked that the American (U.S.) system of Patent Law was much admired as of very great advantage to the industrial progress of the United States, and, after having paid several visits to that country and fully investigated the subject, he thought it a good law, and he for one wished we had the same here. The Bill of Messrs. Anderson, Broadhurst, and Brown, although it did not deal with all the different points of amendment needed, was, he thought, a step in the right direction, and being the only Bill before the Legislature, it would be unwise not to give it support. As he was desirous of eliciting the views and opinions of those present, he would at once invite discussion.

MR. J. M. HYDE said that he felt inclined to endorse every word of Sir Antonio Brady's speech, but, for all that, must remark that it seemed to him that the Inventors' Institute should throw more fire and energy into the work of Patent Reform, for it must not be lost sight of, that many of the leading politicians of the day were against the Patent Laws altogether, and would therefore hinder their improvement. For his own part, he considered it a sad but truthful fact that America was out-rivalling us in commerce and manufactures, and the cause of this was the difference of the Patent Laws of America as compared with those of England. Here the notion was that the inventor should have no special benefit awarded to him, but it must forsooth be thrown open to the public free and for nothing. In America, a workman, feeling that he can, without insuperable difficulty, secure a patent property for himself for a new improvement, studies his machinery to see if he can do so, and is led to make improvements, seeing he can get a patent for a few dollars. With regard to the Bill before Parliament, he would just remark that although it was not all that was wanted, yet as it was before Parliament and was a step in the right direction, it ought to be heartily supported by the Institute.

Mr. F. H. VARLEY—As a member and office-bearer of the Institute of long standing, must just assure Mr. Hyde that it had done everything that could be done, and if it had not kept on through good report and evil report, the matter would not now be before the Legislature and public in so favourable a shape as it was, and certainly the Institute does not mean to let the subject drop. For himself, he considered Mr. Anderson's Bill was a good one, with more in it than a cursory review would make apparent. It provides for three paid commissioners, efficient men to carry on the Patent Office, and that Patent fees should be very low—£4 for the first seven years' patent—and not be a tax on inventors, that is, practically a seven years' patent, which term would, he thought, prove whether the invention would pay or prove its utter uselessness. After speaking of Dr. Siemens in terms of high approbation as a man of science and inventor, he remarked that at the last inventors' dinner he had expressed his approval of Mr. Anderson's Bill, and he thought that it was a great fact that the Act of 1852 had never been properly carried out, and that this Bill would do much to give it good effect.

Mr. LEFEVRE thought Mr. Anderson's Bill a step in the right direction, and that there was something radically wrong in the present state of the Patent Law. This and Private Bill Legislation he deemed great blots on our system. He would say continue to agitate the country, and let it be well spread abroad that the want of invention in this country is attributable to the Patent Law.

ADMIRAL SELWYN said to his mind the national side of the Patent Law question was the main point. A nation either produces or buys its food. In the present state of inter-communication, no nation can produce food at a profit unless it can produce it more cheaply than, or at least as cheaply as, any other nation. If this be not the case, then certain kinds of food cease altogether to be produced, and they are introduced from other places, where these conditions can be fulfilled. How, then, can the nation which does not produce pay for such food. Clearly it must be by some other product. What product can this manufacturing nation most easily and most cheaply supply,—the joint product of brain and hands encouraged by capital. These three factors could be found in England in a measure till now greatly superior to that existing in any other country. Why, then, should we not employ such means. The reason why we should not is hard to be found. The reason why we do not is that we have misunderstood the question of Patent Law. It has been thought that it was a mere inventor's question. It has been asserted that it would ruin manufacturers if any alteration were introduced. It has been believed by some that Patent Laws were a mistake from beginning to end, and should be abolished. But a change is coming over the spirit which prompted such a dream. We are beginning to find the truth of the adage, that the nation which ceases to progress in arts, arms, commerce, and industry has begun to recede. Unless we can labour with profit, and not only pay for our food but lay by something besides, we must become as poor as other nations have become who once were wealthy as ourselves, but who neglected progress and embraced luxurious expectations. Now, without any robbery of manufacturers or landowners, without any change which will destroy existing trades or interests, we can develop industry to an incalculable amount. I say incalculable, and the word is perfectly justifiable. If one invention like Bessemer's in half a century can change the whole face of the iron trade, and produce steel at the former price of iron, what may not be done when the whole inventive genius of the nation is set free to give new employment to industry? This is, no doubt, an attractive feature, but it is one that can never be realised without the aid of the capitalist. How is that aid to be secured? By a title without flaws, in which he can invest his money with some degree of security. Is there any real difficulty in giving such a title? Is there any good reason why it should not be given? Can capital be expected to go anywhere or to do anything unless the speculation be such as to offer reasonable chances of success? If we even admit that the American law does not give such perfect security as we might desire, is it impracticable to give it? There is not the least reason why property in invention should be less easily protected than any other form of property. Let public expression be given to the opinion that patents for invention should be given indefeasibly after due notice, in the interest of the nation, and there will be crowds of lawyers and shoals of petitioners, who will emulate each other in forwarding the national wishes. But there must be no mistake. The legislation must be based on eventual benefit to the nation, not on mere ephemeral advantage to individuals. The seed corn of industry, which is invention, must be carefully fenced round instead of being taxed, must be uncovered sedulously to grow, and not regarded as a monopoly by some, as a source of public revenue by others; robbed before it has grown to maturity, or expropriated as soon as it has produced a revenue. The Bill before Parliament, he thought, should be accepted as a first instalment, and with regard to it, he might remark that every one of its points of soundness reproduced the views and suggestions that the Council of the Inventors' Institute he and others formulated in the draft of what they termed an "Inventors' Right Bill," which the Institute brought under the notice of the Government some years ago, and which had, doubtless, been used or misused in the production of Patent Bills which had been brought before Parliament but let slide down into nothing, because they had no special party political advantage belonging to them.

The PRESIDENT (Sir Antonio Brady) said we want all men to aid us in the Government of this country, which depends upon popularity, and he for one should not anticipate any difficulty in persuading the present premier to look upon matters in this way.

Mr. SINCLAIR, speaking for workmen, argued that they could not do better than make the Patent Laws a great battle cry, for they were, of all men, deeply interested in the matter.

Mr. H. JONES stated that as he was interested in a great political organisation in South London, he could do much to forward reform of the Patent Laws, and would promote the signing of petitions on the bill.

Mr. T. MORGAN, as Hon. Secretary of the Patent Reform Committee, said that he would be most happy to have the assistance of Mr. Jones in carrying out the good work.

Mr. J. M. HYDE, by way of doing something practicable, proposed a resolution.

Mr. F. W. VARLEY seconded this resolution. (See proceedings of Inventors' Institute.)

Mr. LEFEVRE supported same.

After some remarks from Mr. HATFIELD, the resolution was passed.

Mr. CAMPIN briefly explained the difference of Foreign Patent Laws and those of this country, and concluded by proposing a vote of thanks to Sir Antonio Brady and Admiral Selwyn, which was carried unanimously.

DEATH IN THE GAS.

By THOS. FLETCHER, F.C.S.

DEATH after death and repeated narrow escapes in connection with the use of a certain class of bath-heaters have created a scare and terror which has extended to a fear of the use of gas for any purpose. This fear has been increased by certain foolish persons writing letters to the public press, containing statements which have no grounds except in their own imaginations, and which create serious mischief and annoyance. As a matter of public duty, it is time this state of things was settled and put in such a form as to be easily understood, and the danger, when it exists, readily recognised. One correspondent, who signs himself "M.D.," says that the immense quantity of gas used for cooking is dangerous. With all due respect to "M.D.," this statement is simply nonsense; he evidently has no correct knowledge or information on the matter. The tablets, which I enclose to the editor, give day by day the actual gas consumption in an average household for all purposes. The name and position of the authority for these figures are quite sufficient to vouch for their correctness. In these it is shown that the daily consumption of gas for lighting purposes is 113 cubic feet; the average daily consumption for cooking is 25 cubic feet. It is, therefore, evident that the danger, if it could exist, cannot be from the quantity of gas consumed for cooking, which for the whole day is less than what is burnt for lighting purposes in an ordinary sitting-room in one evening. The danger is here, it is because the fashion to expect to heat, in perhaps ten or fifteen minutes, a quantity of water sufficient for a twenty or thirty gallon bath. It is well known that, of all substances, water is perhaps the most difficult to heat, and to attain this result a consumption of probably 25 cubic feet of gas is required within ten minutes. The consumption of 25 cubic feet of coal gas will require about 250 cubic feet of air, and this burnt gas and air will vitiate at least 1,500 cubic feet of air, so as to make it totally unfit for respiration. The cubic contents of an average bath-room will not exceed about 750 feet, and the consequence is that in about five minutes the air is completely poisoned for respiration. Further than this, the partly burnt air, by the circulation of air in the room, is again and again returned to feed the flame. Gradually the combustion gets sluggish and imperfect, causing the formation of poisonous acetyline and carbonic acid. The only remedy in this case is a complete and perfect exit for all products of combustion, instantly as formed, by a special flue in which there can be no back draft; or, what is better, the use of a slower and more reasonable system of heating the bath by gas, in which the gas consumption is so small that the products of combustion are scarcely perceptible, allowing ample time for their exit by the leakage of air round the door and window-frames; in fact, doing the same as is daily done in the case of lighting burners in an ordinary room. This system of heating baths is quite as effective and more satisfactory, as it admits of the bath-room and under-clothing being warmed. The time required to heat the water in a small cylinder starting all cold is about 2 to $2\frac{1}{2}$ hours with a burner consuming 10 cubic feet of gas per hour, and this quantity of gas can be safely burnt in any small bath-room with both door and window closely shut. In the absence of special flues, it is the only system possible with gas without danger. If hot water is wanted continuously, a very tiny flame kept in will do all necessary when the water is once hot. To use gas in a small close bath-room at the rate of 70 to 100 cubic feet per hour is equivalent to putting a large charcoal brazier in the room; either would cause suffocation in a few minutes.

We have used gas for many years to the total exclusion of fires for cooking, water-heating, and daily baths. Our family consists of ten persons, and our average daily gas consumption for all cooking and water-heating purposes does not exceed 40 feet per day—average cost $1\frac{1}{2}$d. Our total consumption for lighting is, on an average, 150 cubic feet per day—cost, 6d.; and we burn in one room, every evening, more gas for lighting only than is used all over the house for cooking, baths, and all work of this class. It is, therefore, absurd to say that the quantity of gas used for cooking can be either injurious or dangerous. A bad cooking burner, and also a bad lighting burner will make itself disagreeable by the formation of a trace of acetyline and carbonic oxide. The remedy is simple: see that the burner in fault is made right or replaced. Gas has been used too long for lighting purposes to admit of any foolish statements being allowed to pass without question, and ventilation is rarely thought of in ordinary dwellings. It is also evident that for cooking, gas is absolutely safe even when used freely; and when the fact is once clearly understood that when burnt in large quantities for heating water rapidly, it requires a free and direct exit for the products of combustion, the present scare will disappear and accidents will be unknown. The makers of high-power water-heaters are greatly to blame for not insisting on the fact that a special flue must be provided. This necessity is well known to work, and its non-publication can only be accounted for by the knowledge that people would not buy instantaneous water-heaters if they, as is the case in most bath-rooms, could not put in a satisfactory flue to take away the products of combustion.

SPENCE'S METAL.

THIS metal, it is affirmed, possesses the most remarkable properties for joining gas and water-pipes and is proved by testimonials from high officials of various gas and water companies to have the following advantages over lead:—One ton of Spence's Metal will go as far as three tons of lead. No caulking being necessary, the time for making a joint is about one-tenth of that usually spent with lead. In plain pipes, where the spigots have been cut off, it merely requires packing with a piece of rope-yarn before pouring in the metal. For fastening all kinds of iron work and glass in stone or wood, Spence's Metal is much cheaper, and retains a better hold on the iron or stone than any other material, and its application is easy and effective. It is fast superseding lead for iron railings. The Spence's Metal is specially worthy of the attention of architects and builders; moulds made of the metal produce concrete castings with the finest arrises; they show the true and accurate form of all members of mouldings, and give a fine smooth surface to all ornamental work. Another important feature in the moulds made of Spence's Metal is that cement, plaster, clay or water, do not injure the arrises, and that any number of perfect castings may be produced with the same mould, and the metal can be used over and over again. It can also be used for covering and repairing roofs, or making inaccessible corners water-tight. To iron-founders and engineers, it will be found most useful for bearings, for filling up defective castings, for all descriptions of rollers, for packing purposes, for fitting pulleys to shaftings without keying, and for engineering work in general. It will supersede the use of block tin for patterns to be kept in stock. The metal resists most of the acids and alkalies, distilled or salt water or atmospheric action, and it is almost an absolute non-conductor of heat and cold. It is most suitable for lining tanks, cisterns, or pipes, and for coating or enamelling baths, sinks, or other household fittings, and also for covering bricks, walls, and other surfaces. Tanks and pipes lined with Spence's Metal will not oxidize or rust. Water or gas pipes coated with it will resist the detrimental actions of the frost. To distillers, brewers, wine merchants, bottlers, and exporters it is infinitely superior to bottle wax, and obviates the use of wire or capsules. It is now adopted for the capsuling of the Duc de Montebello's Champagne for Export. The very finest castings, such as reproductions of works of art, are made from this metal, which take the finest polish, and are absolutely insensible to the action of the air, or other climatic influences. Many beautiful reproductions of antique bronzes have been made by Spence's Metal, and have been highly approved of by some of the most eminent sculptors. A life-size statue of Canova's Venus, cast in Spence's Metal, can be seen in the gardens of the South Kensington Museum, where it was visited by H.R.H. the Prince of Wales. The metal can be made to produce beautiful imitation marble enamels, which form an excellent material for chimney-pieces, tombstones, or mural decorations. Any moulds, whether of metal, wood, plaster, flour, or even of gelatine, can be used for the Spence's Metal. Spence's Metal can be used for printing, stereotyping, engraving, and for an endless variety of other purposes. The well known firm, Messrs. J. Berger Spence and Co., 31, Lombard Street, E.C., are the proprietors of the above.

The Scientific Review

AND

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Established 1st May, 1862.

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President, SIR ANTONIO BRADY.

SESSION 1880—1881.

Members' Meetings at 8 p.m. on Thursdays, May 12th and 26th; and June 9th.

Annual General Meeting, Thursday, May 26th, at 4 p.m., unless otherwise arranged.

Subscriptions are payable to Mr. G. A. Stretton, the Receiver, 4, St. Martin's-place, S.W., who is the proper official to give receipts.

F. W. Campin, Sec.

Proceedings of the Institute.

Thursday, April 7th.

A Conference, attended by Members of the Inventors' Institute and others, was held at 4, St. Martin's Lane, Trafalgar Square. Sir Antonio Brady (President of the Institute) occupied the chair, and Admiral Selwyn (Vice-President), Mr. F. H. Varley, Mr. T. Morgan, Mr. Greenfield, Mr. Kenny (Member of the Patent Law Reform Committee), Mr. F. W. Campin (Secretary of the Inventors' Institute), and other gentlemen took part in the proceedings, which will be found reported in another column. At this meeting Mr. J. M. Hyde proposed, Mr. Varley seconded, and it was carried unanimously, "That Messrs. Anderson, Hinde Palmer, H. Broadhurst, and A. Brown, the Members of Parliament who have introduced the Patent Law Amendment Bill now before the House of Commons, be urged to press it forward without delay.

Monthly Notices.

The Earl of Caithness, who died suddenly, in America, U.S., March 28, was a man of considerable scientific ability and withal an inventor who had reason to be proud of his attainments. His principal invention was the ship's compass which bears his name. The Caithness gravitating compass is one of the steadiest known to navigators, and is widely used. He perfected a steam motor for macadamised roads, acting as his own engine-driver when testing it. He also invented and patented a tape loom by which the weaver was enabled to stop any one of the shuttles without stopping the loom. This invention was pronounced unpractical at first, but after a short trial in a Lancashire factory, it was found to answer the purpose better than the old device, and has since been universally adopted in the manufacturing centres of North England. Of late years the Earl has travelled largely in America and Europe, has written somewhat, and delivered many scientific lectures. He was a member of the Inventors' Institute from its establishment, and for many years a vice-president.

Colonel E. A. Roberts, the inventor and patentee of the successful torpedo for oil wells, died after a brief illness, in Titusville, Pennsylvania. Colonel Roberts was a man of great enterprise as well as ingenuity, and had much to do with the development of the Pennsylvania oil region.

Carl Weyprecht.—Carl Weyprecht, the Austrian Arctic explorer, died at Vienna, March 29. Weyprecht and Julius Payer were joint commanders of the Austro-Hungarian Expedition in the "Tegetthoff," which discovered Franz Josef Land after months with an ice floe, in which the Tegetthoff was abandoned in August, 1874.

The Microphone as a Detector of Fire-damp.—M. Michel Rossi states that the accumulations of fire-damp are accompanied by faint subterranean noises, which the microphone indicates with much sensibility. By grating sounds this instrument proclaims the escape of gas, and M. Rossi argues that this, added to barometric warnings, would forewarn the superintendents of mines and consequently prevent explosions.

Germination.—M. Pauchon, a French observer, has been making experiments on the germination of beans. He states that black or violet seeds absorb more oxygen than white or yellow ones, though a more rapid germination is observed in the latter. Carbonic acid is said to be exhaled in greater quantity from white than from dark seeds. "The more frequent and pronounced pigmentation of the seeds of Northern lands is, therefore," says M. Pauchon, "a favourable circumstance for the growth of these organisms under the peculiar light-conditions to which they are subject."

Action of Hydrochloric Acid upon Lead Chloride.—M. A. Ditte.—In a memoir on the action of hydrochloric acid upon the metallic chlorides the author has omitted lead chloride, which behaves in a special manner. The solubility of this salt in water decreases at first as increasing proportions of acid are added, but with a further increase the solubility of the salt becomes greater. Lead bromide and iodide behave in a similar manner in presence of their respective hydracids.

A New Method for the Analysis of Oils.—E. J. Maumené treats a measured quantity of oil with a measured quantity of standard caustic alkali. Ten c.c. of oil measured with a pipette were heated in a boiling water-bath for an hour with 20 c.c. of a solution of potassa, which would neutralise 123 c.c. of sulphuric acid at 98 grms. = 1000 c.c. At the end of this heating the linseed oils mentioned in the previous memoir all yielded a cake of soap, solid or very firm when hot, always solid when cold, and easily separated by mere draining. The alkaline solution is very differently acted upon by different samples. It still neutralises smaller quantities of acid, differing in case of every sample.

The Tar of Cork.—Cork-waste has been for some time used for the manufacture of lighting gas. The products are at once analogous to those yielded by wood and by coal. The author has obtained acetic acid and methylic alcohol ammonia and hydrocarbons similar to those of coal. The ketons characteristic of wood-tar are wanting.

THE SCIENTIFIC REVIEW
AND
Scientific and Literary Review
INCORPORATING THE "JOURNAL OF THE INVENTORS' INSTITUTE."

MAY, 1881.

SEA-GOING SHIPS.

The insular position of this country must render the question of the construction of safe, speedy, and easy-going sea vessels a question which will be readily placed amongst public matters of the highest importance; for if we could be assured that sea sickness could be prevented, and a voyage over sea rendered as pleasant, not to say luxurious, as a journey in a Pullman Car, and the perils of the sea set at naught by anti-sinkable arrangements, and further, having regard to the necessities of transport for commercial purposes, improvements in sea-going vessels cannot be over-estimated.

Taking such a view of the case as we have indicated, we feel no surprise that what is to be done with the extraordinary turbot-shaped yacht Livadia, built for the late Czar, has become an interesting question in Russia. Admiral Popoff still thinks he can make of her the most nearly perfect vessel afloat, but the damages sustained by her appear to be greater than were at first supposed. There are several large cracks in her, one of them 10 feet long and a foot wide. How the accident occurred by which the vessel came into this sorry condition has not been established. It will be remembered, says the *Liverpool Mercury*, from which we quote, that some eminent English experts gave it as their opinion that the damage must have been produced by contact with a wreck. In view, however, of the fact that the sides or ribs of the fore part of the vessel are damaged or strained, it is impossible, the Russians say, that wreckage alone could have been the cause of the accident. Besides, it is observed, the screws and their appurtenances would inevitably have been considerably damaged by floating wreckage passing under the ship, and this is not found to have been the case. What is now suggested by Admiral Popoff is that the vessel should be encased in wood, as soon as she can be brought in safety to the Black Sea. Evidently, however, the new Czar does not share the confidence of the naval authorities of Russia regarding the merits of the imperial yacht, for he has ordered a new steel vessel to convey him to the Crimea. The failure of the Livadia has raised a warm discussion on the whole management of naval affairs in Russia. The *Golos* remarks that the naval budget of Russia for the ten years between 1870 and 1880, when compared with that of England for the same period, shows that, although the sum spent by Great Britian on naval construction was only between two and three times more than the amount expended by Russia on the same account and for the same time, England acquired six times the number of new vessels that Russia did, to say nothing of their quality. Entering into details, the *Golos* points out that in the ten years ended with 1880 the Russian Ministry of Marine spent 298,920,910 roubles, of which 72,000,000, or only 26 per cent. of the whole sum, was devoted to shipbuilding proper. For this sum Russia got the Peter the Great, the two Popofkas, three frigates, eight clippers, four cruisers from America, four imperial yachts, including the Livadia, four schooners, nine gunboats, two torpedo boats fit for sea, and 115 torpedo sloops unfit to leave the coast. In other words, after putting aside the two Popofkas and other smaller vessels good for coast defence only, the Russian fleet was augmented for the above amount by only one ironclad, three semi-ironclads, twelve other sea-going vessels, and four yachts for passenger service. A glance at English expenditure on naval construction for the same decade shows that for £19,200,000, or 170,213,000 roubles, we acquired 24 ironclads, three frigates, 30 corvettes, 52 clippers, 15 gunboats, six transport vessels, and a large number of smaller vessels for coasting service. From the comparison it would appear that the Russian Government is very much more unfortunate than our own in the value it receives for its extraordinary expenditure in maritime construction. For years past the Government of St. Petersburg has been characterised by its anxiety to create a great fleet, but its efforts have generally resulted in collapses like that of the breakdown of the Livadia.

We have no desire to affirm any of the political observations that our contemporary would have no hesitation to use, for we feel very grateful to any and every government that takes such an interest in the improvement of sea-going vessels as may advance the objects for which the Livadia was designed and constructed, and until the goal is arrived at we feel bound to say God Speed.

Proceedings of Societies.

ROYAL SOCIETY.

MARCH 31.—The President in the chair. The following papers were read: "On the Co-efficients of Expansion of the Diiodide of Lead (PlI_2) and of an Alloy of Iodid of Lead with Iodide of Silver (PbI_2AgI)," by Mr. G. F. Rodwell,—"Permanent Molecular Torsion of Conducting wires produced by the Passage of an Electric Current," by Prof. Hughes,—"On the Tendinous Intersection of the Digastric," by Mr. G. E. Dobson,"—and "Note on Protagon," by Dr. Roscoe.

SOCIETY OF ANTIQUARIES.

MARCH 17.—H. Reeve, Esq., V.P., in the chair.—The Vice-President informed the meeting that in consequence of the resolution passed by the Society, and of representations which he had himself made, a movement had been set on foot in Bath to raise a sum of money to meet the necessary expenses for preserving uncovered some of the very interesting remains which had been opened to view during the progress of the drainage works in that city. The Duke of Cleveland had given £100.—Sir H. Dryden, Bart., exhibited a silver brooch, in open work, in the shape of a heart crowned. On the back was scratched the word "Vertue." Date seventeenth century.—Dr. W. Legg exhibited three communion cups from the churches of Swinefield, Hawkinge, and Stanford, in the county of Kent, of the dates 1562, 1565, and 1586 respectively. This exhibition was accompanied by some remarks from Mr. W. Cripps, the author of "Old English Plate." Two specimens of plate by the same maker as that of the Swinefield cup are figured in that work, pp. 195, 262. The Stanford cup has for maker's mark a lizard or newt on a barrel, which Mr. Cripps conjectures to be a rebus for the name of Newton.—Mr. R. S. Ferguson exhibited two communion cups from Hayton and Bolton respectively, in Cumberland, which Mr. Cripps assigned—for having been made probably at Carlisle, they have no regular year-letter—to about the year 1565. Mr. Ferguson also exhibited a silver tankard from Drumburg Castle with the year-letter for 1678.—Mr. A. W. Franks exhibited a curious circular Saxon seal, found in a garden at Wallingford, and made of some kind of ivory. Along with it were found a small comb and a bone, both of them perforated for suspension. In general appearance it reminded one of the Wilton seal of Eadgitha or Edith figured in the *Archæologia*, vol. xviii., p. 40. The Wallingford seal bore on one side the words "Sigillum Godwini Ministri," and on the other side "Sigillum Godwithæ Monache Deoclatæ." From the top, as in the case of the Wilton seal, stood out a sort of mitre-shaped excrescence, on which, as far as could be conjectured, was a representation of the Blessed Trinity; the first and second persons seated and trampling on a female body, the emblem probably of Sin or Death or Vice.—The Rev. W. C. Lukis laid before the Society a further report of his survey of prehistoric monuments in the west of England, and especially on those of Dartmoor—a survey which, as on two former occasions, he had executed at the instance and on behalf of the Society. To Dartmoor, Mr. Lukis believed, must be assigned the blue ribbon in respect of the multitude and interest of its rude stone monuments. If Cornwall is distinguished for thirteen great circles and seven huge cists, Dartmoor can boast of six large circles, and especially of twenty-four avenues and lines of upright stones, one of which far surpasses in length the longest of those in Brittany, being not less than 11,239 feet in length. To a description of these remarkable avenues, and to conjectures as to the motives for their construction, the greater part of Mr. Lukis's interesting report was devoted; the remainder was occupied with a description of the six large circles and of the burial mounds, hut circles, and holed stone cells of Dartmoor; the whole was illustrated by a very large number of scale plans and drawings.—A hope was expressed that no time would be lost in commencing the publication of these and former drawings presented to the Society by Mr. Lukis.

MARCH 31.—A. W. Franks, Esq., V.P., in the chair.—Notice was given that the annual meeting of the Society, for the election of the President, Council, and Officers of the Society, would be held on Saturday, April 23rd, at 2 p.m.—A resolution of the Council was laid before the meeting to the effect that, having learned from their Vice-President, Mr. H. Reeve, that a subscription had been set on foot in the city of Bath for the purpose of defraying the expense of keeping the large bath permanently uncovered, the Council had voted the sum of £50 towards those expenses, subject to that condition being complied with.—Mr. J. H. Cooke exhibited a flint implement from Stinchcombe Hill, Gloucestershire. It was of neolithic type, and had been broken in two, the fractured end having been afterwards shaped so as to fit a handle.—Mr. W. M. Wylie communicated a note which he had received from Dr. Keller, on the presumed use of a wooden post which had been previously described to the Society (*Proceedings*, viii., p. 253), and which Dr. Keller believed to have been used as a "money," or rammer, for driving piles into the bottom of the lake.—Mr. E. Freshfield made the following exhibitions and communications: 1. A collection of stone implements from Smyrna; 2. Some specimens of carved wood from churches in European Turkey, probably portions of a bishop's throne; 3. A stone capital from the church of St. Nicholas, Constantinople, with a puzzling monogram; 4. A stone tablet from some Bulgarian church, with a representation of the Trinity; 5. An account of the church of the Kalenders in Constantinople. This communication was intended to be supplemental to Mr. Freshfield's previous paper on the Christian antiquities of Constantinople, and was profusely illustrated by photographs. Mr. Freshfield was the first Christian who had been inside the church, and this is the first occasion on which photographs of that interior have been seen.

CHEMICAL SOCIETY.

MARCH 30.—*Anniversary Meeting.*—The President, Prof. Roscoe, gave his annual address. He congratulated the Society on its flourishing condition, and touched upon the more important discoveries of the year. The supposed decomposition of chlorine and iodine by Victor Meyer had been found to be capable of another explanation. The solar and stellar evidence of the decomposition of metals accumulated by Mr. Lockyer has not yet found general acceptance by chemists. Capt. Abney and Col. Festing have discovered that the organic radicals, methyl, ethyl, &c., give characteristic absorption spectra in the infra-red part of the spectrum. Baeyer has succeeded in preparing indigo artificially, and its manufacture on the commercial scale is rapidly progressing. The Society has lost by death ten Fellows, including Sir B. Brodie, Dr. Stenhouse, Prof. W. H. Miller, and Mr. Tennant. The Longstaff Medal was presented to Prof. Thorpe, of the Yorkshire College, Leeds, as the Fellow who had done the most to promote chemical science by research. The reports of the President and Treasurer were received and adopted, and the Officers and Council elected for the ensuing year: *President*, Mr. H. E. Roscoe: *Secretaries*, Mrs. W. H. Perkin and H. E. Armstrong; *Treasurer*, Mr. W. J. Russell.

APRIL 5.—Dr. Roscoe, President, in the chair.—The Faraday Lecture was delivered by Prof. Helmholtz "On the Modern Development of Faraday's Conception of Electricity,

INSTITUTION OF CIVIL ENGINEERS.

APRIL 5.—Mr. J. Brunlees, M.P., in the chair.—It was announced that the Council had recently transferred six Students to the class of Members, and had admitted twenty as students.—The monthly ballot resulted in the election of eight Members and of twenty Associate Members.—The paper read was "On the Actual Lateral Pressure of Earthwork," by Mr. B. Baker.

ROYAL INSTITUTION.

APRIL 4.—G. Busk, Esq., Treas. and V.P., in the chair.—Mr. C. Lassetter, Esq., Mrs. L. W. Longstaff, Mrs. E. R. Müller, Mr. E. de la Penha, Dr. A. B. Garrod, Dr. J. L. Sullivan, Messrs. L. F. Cohen, F. Graham, H. Leonard, E. de la Penha, St. George L. F. Pitt, P. Spalding, and G. Wray were elected Members.

SOCIETY OF ARTS.

APRIL 4.—Sir. H. Cole in the chair.—The first of the fourth course of Cantor Lectures, "On the Art of Lace-making," was delivered by Mr. A. S. Cole.

APRIL 5.—Dr. Roe in the chair.—A paper on "Canada, the Old Colony and the New Domain," was read before the Foreign and Colonial Section of the Society by Mr. E. H. Hall, and gave rise to a good discussion.

APRIL 6.—Sir P. Cunliffe Owen in the chair.—A paper "On the Discrimination and Artistic Use of Precious Stones" was read by Prof. A. H. Church.

ANTHROPOLOGICAL INSTITUTE.

MARCH 8.—F. W. Rudler, Esq., V.P., in the chair.—The election of Dr. G. D. Thane was announced.—A collection of rubbings taken from door-posts and window-frames in New Zealand was exhibited. They were chiefly interesting from the proof which they afforded of the clear influence of matted and woven materials on the ornamentation of stone architecture, a parallel to the influence of wood architecture on stone architecture pointed out by Fellowes in Lycia and by Lepsius in Egypt; also from the remarkable coincidence between some of these ornamentations and the outlines on the tombstones of Mycenæ—a near approach to the triglyph in New Zealand.—A short note by Mr. S. E. Peel on Assam pile-dwellings was read, and was illustrated by a series of sketches by the author.—Lieut.-Col. R. G. Woodthorpe read a paper on the wild tribes inhabiting the so-called Naga Hills on our north-eastern frontier of India. The paper dealt only with the Angami Nagas, who, it was stated, differ from all the other hill tribes of Assam in many important particulars, such as appearance, architecture, mode of cultivating, language, and dress. In appearance they are a finer, cleaner, and better-looking race; they build their houses resting on the ground, and not raised on piles, as all the other hill tribes of Assam (Except the Khasias) do, and after a pattern not seen elsewhere. In dress the Angami differs most strikingly from all the other tribes in the kilt or short petticoat of dark cloth, ornamented with rows of white cowrie shells, the waistcloth of all other Nagas consisting only of a flap of cloth in front and behind, and often only in front. The Angamis erect tall monoliths in commemoration of the dead or of some social event. These monoliths, often of great size, are dragged up hill on sledges running on rollers.

MARCH 22.—F. W. Rudler, F.G.S., Vice-President, in the chair.—The election of George B. Waterhouse was announced.—Mr. R. W. Felkin exhibited a series of photographs of scenes and natives of Central Africa, taken by Herr Buchta.—Professor

Flower, F.R.S., exhibited a collection of crania from the island of Brallicollo, in the New Hebrides, which had been lately presented to the museum of the Royal College of Surgeons by Mr. Luther Holden. The peculiar conformation of the heads of the people of this island attracted the attention of Captain Cook and the naturalist Forster, who accompanied the great navigator on his second voyage, and who writes that "the depressed and backward-inclining forehead causes an appearance in the looks and countenance of the natives similar to those of monkeys." Yet Cooke bears testimony to the activity, intelligence, and honesty of this "ape-like nation," as he calls them. A few years ago, Mr. Busk described some skulls collected in the island by the late Commodore Goodanough, and found that they all showed signs of having undergone alterations in form from pressure applied in infancy. The present collection corroborates Mr. Busk's views, some of the skulls being deformed to a remarkable degree, and closely resembling the well-known Peruvian crania from the neighbourhood of Lake Titicaca. This is the more remarkable as on no other of the numerous islands of the neighbouring ocean is the practice known to exist. Besides the deformed crania, the collection contained several monumental heads, said to be those of chiefs. In these the features are modelled in clay upon the skull, apparently with the intention of preserving a likeness of the dead person. The face is painted over with red-ochre, artificial eyes introduced, and the hair elaborately dressed and ornamented with feathers. In one case the hair has been entirely removed, and a very neatly-made wig substituted. The head, thus prepared, is stuck upon a rudely-made figure of split bamboo and clay, and set up in the village temple, with the weapons and small personal effects of the deceased. This is a custom not hitherto known to exist among the Mallicollese, and its motive is not completely understood; but it is obviously analogous to many others which have prevailed throughout all historical times and in many nations, manifesting itself, among other forms, in the mummified bodies of the Ancient Egyptians and the marble busts over the mouldering bones in Westminster Abbey.—Mr. Joseph Lucas read a paper on "The Ethnological Bearings of the terms Gypsy, Zingars, Rom, &c."

MATHEMATICAL SOCIETY.

March 10.—S. Roberts, Esq., President, in the chair.—Prof. Cayley read a paper "On the Equilibrium and Flexure of a Skew Surface."—Mr. Tucker communicated portions of papers, viz., "An Application of Elliptic Functions to the Nodal Cubic," by Mr. R. A. Roberts, and "Note on Prof. C. S. Peirce's Probability Notation of 1867," by Mr. H. McColl.—Mr. J. W. L. Glaisher having taken the chair, the President communicated a theorem, the direct analogue in space of a theorem relating to three circles intersecting in a point, which he took as a point of departure for the study of four spheres meeting in a point.

NUMISMATIC SOCIETY.

March 17.—J. Evans, Esq., President in the chair.—Mr. W. Bramsen was elected a Member.—Mr. A. E. Copp exhibited specimens of various specimens of various farthings and halfpence of Queen Anne's reign.—Mr. R. A. Hoblyn exhibited a proof of the large farthing of Charles II. in silver, with the rare date 1675; also a proof of the Maltese *grano* or one-third of a farthing of 1866.—Prof. P. Gardner communicated a paper on floral patterns on archaic Greek coins, in which he expressed his opinion that the device on the coins of Corcyra commonly called the Gardens of Alcinoüs does not represent a garden, but simply a flower or floral ornament, similar to that which is also to be seen on early coins of Cyrene and Miletus, &c. Prof. Gardner further remarked that various flowers were consecrated to various deities, and that in each city the flower chosen for the type of its coin was closely connected with the ruling cultus of that city.—The Rev. Canon A. Pownall contributed a paper on a recent find at Nottingham of coins of Henry I. and Stephen, with the object of calling attention to certain defaced coins of Stephen, of which there are a large number in that hoard. These coins have been defaced in the die before striking, the intention having been to obliterate the king's head. Canon Pownall suggested that this defaced money of King Stephen was, in fact, the coinage known to his contemporaries as "the Duke's money," or the coin issued by Henry, Duke of Normandy (afterwards Henry II.), when he invaded England in 1149.

ZOOLOGICAL SOCIETY.

March 15.—Prof. W. H. Flower, President in the chair.—The Secretary read a report on the additions made to the Society's menagerie during February, and called special attention to a female Bactrian camel (*Camelus bactrianus*), and to a female wild sheep (*Ovis cycloceros*), obtained from Afghanistan.—Mr. A. G. More exhibited some eggs of the red-necked phalarope, believed to have been taken in England; and an egg of the tree-pipit, taken near Dublin, this bird having been considered only doubtfully Irish. Mr. Moore also exhibited a specimen of the red-chested pochard, obtained near Tralee, being the first record of the occurrence of this species in Ireland.—Mr. R. B. Sharp exhibited a specimen of the so-called Sabine's snipe (*Gallinago Sabinii*), shot in July last near Selborne, Hants.—Papers were read by Prof. F. J. Bell, the fourth of his series of observations on the characters of the Echinoidea, and on a new species of the genus Mespilia, obtained at Samoa by the Rev. S. J. Whitmee, which the author proposed to name after its discoverer, *M. Whitmei*,—by Mr. W. A. Forbes, the fourth of his series of papers on the anatomy of passerine birds,—from Prof. Newton, in which he proposed to substitute the name Hypositta for Hypherpes, which he had formerly proposed for a genius of passerine birds found in Madagascar,—and from Mr. M. Jacoby, on new genera and species of phytophagous Coleoptera.

SOCIETY OF BIBLICAL ARCHÆOLOGY.

April 5.—W. Morrison, Esq., in the chair.—The following compositions were read: "The Times of Israel's Servitude and Sojourning in Egypt," by Ernest de Bunsen,—and "On the Consonant's S, R, and L in Assyrian, by Mr. T. G. Pinches.

ARISTOTELIAN SOCIETY.

March 28.—S. H. Hodgson, Esq., President, in the chair.—Mr. S. Oliver read the second and concluding part of a paper on Kant, which was followed by a discussion.

ON MAINTAINING RIVERS, ESTUARIES, AND HARBOURS.

By Walter R. Browne, M.A., M. Inst. C.E.

At a recent meeting of the Institution of Civil Engineers, Mr. Abernethy, F.R.S.E., President in the chair, "The Relative Value of Tidal and Upland Waters in maintaining Rivers, Estuaries, and Harbours," by Mr. Browne, was read, which set forth that the two natural agencies which tended to keep clear the channels of tidal rivers and estuaries were—the tidal flow, *i.e.*, the run of the tide passing up and down such channels twice in about every twenty-four hours; and the low-water flow, *i.e.*, the current of water passing through such channels between the end of each ebb tide and the beginning of the next flood. It was proposed to investigate the relative value of these two agencies in preserving the full depth and section of such channels. The author, while declining to lay down any universal rule, held as a general principle that the main scouring agent was not the tidal but the low-water flow. This principle could be supported by the following line of argument:—1. The silt, which tended to choke up tidal channels, was almost wholly due to the tidal water, and not to the fresh water. 2. The tidal water brought up more silt on the flow than it took down on the ebb; *i.e.*, on the whole it tended to choke the channel, not to scour it. 3. The low-water flow, if left to itself, scoured away the deposit and kept the channel open. 4. Hence it was concluded that where the two acted together, the scour must be due mainly, if not entirely, to the low-water flow, and not to the tidal flow.

1. Rivers below the tidal area were much larger and much more muddy than above, the mud being derived from the beating of waves upon the foreshore. 2. The banks of a river, between high and low water, were thickly covered with silt, and any single tide left a film of silt over the whole slope down to low water. This silting up was only checked by the mud on these slopes slipping down into the low-water channel; and the deposit was always less in winter than in summer. Where low-water flow was absent, the channel silted up, as was shown by half-tide basins, and by special instances. 3. All rivers scoured out their own channels, and the low-water flow, even in tidal waters, kept the bottom perfectly clean, as had been proved in the case of the Avon.

Low-water scour was in its nature self-regulating, whilst tidal scour, if it once began, would tend to increase indefinitely. The essential point was to discover the ratio of the bottom to the surface velocity under all possible circumstances, since it was obvious that the former alone had any scouring effect. A table was given, prepared from Graeve's experiments on the Oder, which showed that between the depths of 2 and 3 metres the ratio of bottom to surface velocity diminished from 0·67 to 0·55, or by about 18 per cent. It would thus appear that the ratio diminished rapidly with an increase of depth. This conclusion was supported by the experiments of Mr. Révy, of General Ellis, on the Connecticut River, and of the Dutch Government, on the Lower Rhine. These observations were all made in ordinary fresh-water rivers: their application to tidal channels was doubtful, because then the river, instead of being (in a theoretical point of view) indefinitely long, fell at a short distance into an estuary whose waters might be considered at rest. Hence the river waters must expend some energy in displacing the waters of the estuary, and this would check their velocity higher up and near the bottom, and might destroy the velocity altogether. By the assistance of Mr. T. Howard, M. Inst. C.E., and of Mr. H. S. Hele Shaw, Assoc. M. Inst. C.E., the author was able to conduct two series of experiments on the surface and bottom velocities of the River Avon, in the course of an ebb-tide. Both series of experiments showed that during the greater part of the ebb the bottom velocity was actually nil. When about two-thirds of the ebb was over, the bottom layers of water appeared to start into activity, and to assume a velocity about two-thirds of that at the surface.

The following conclusions were drawn from these and other experiments:—In the largest rivers the bottom velocity was for practical purposes the same as the surface velocity. In ordinary rivers the bottom velocity bore to the surface velocity a ratio which was about three-fourths at 5 feet depth, one-half at 15 feet, and one-third at 25 feet. In tidal channels, such as the Avon, during two-thirds of the ebb, the slope of the surface was exceedingly small; and while the surface velocity was large, the bottom velocity was nil. During this period no scour, but rather deposit, was going on. For the remainder of the ebb the conditions approximated to those of an ordinary river; scour did go on, but its amount was insufficient to sweep away the silt which had been deposited, not only at the top of the tide, but also during two-thirds of the ebb. At the same time there were certain circumstances in which the tidal waters might have a distinct scouring effect; viz., if they were so far kept back (either artificially or by soaking into wide mud flats), that a portion of them remained to increase the velocity of the low-water flow.

Opinions were quoted to show that while the author's views were opposed to those of many engineers, they were supported by others, and by numerous facts adduced in evidence before the Tidal Harbours Commissioners, and elsewhere. With regard to the practical application of these principles, it was suggested that, whether a given diminution should be made in the tidal area of any river, would be as follows:—The low-water discharge at some point below the proposed embankment should be carefully measured, and the total discharge of the inland or fresh waters should be measured at their entrances into the tidal area. The difference between the two would show the extent to which the low-water flow was increased by tidal waters. The effect of the proposed operations might then be judged of, by ascertaining how far they would reduce, not the cubic content of water passing up and down on each tide, but the area of mud, which was submerged by the tide, and thence contributed to the low-water flow.

Embankments had frequently proved beneficial rather than the reverse; a fact explained by the author's experiments, since the level of the ebb-tide would in consequence fall more rapidly, and the point at which the water at the bottom began to move would be reached at an earlier period. Another application of the principle was to the process called "dockising," a process which had frequently been condemned on account of supposed injury to the river itself, or even to the estuary in which it flowed, but, as would appear from this paper, without foundation.

RECENT AMERICAN AND FOREIGN INVENTIONS.

Grain Separator.—Mr. Owen Davis, of Sullivan, Ind., has patented a separator for grain, &c., so constructed as to drive off the chaff and straw, separate the larger and smaller kernels of wheat, separate the split kernels of wheat, and the cockle and cheat from the grain, separate red clover seed, timothy seed, and red top seed from the grain and from each other, and to separate the larger kernels of oats from the smaller kernels,

Churn.—Mr. Fred. Aldred, of Glencoe, Ontario, Canada, has patented a swinging shurn, having supporting springs, made in S shape, and attached to the end of the churn above the central line; by this means the churn body is supported and allowed to vibrate.

Button.—Mr. Philip H. Long, of Newark, N.J., has patented a separable button so constructed that the head and foot can be readily connected and disconnected, that the buttons will not turn in the button holes, and in which the fastening mechanism is connected with the foot, so that any kind of heads can be used.

Washing Machinery.—Messrs. Francis W. Ashton, of Hyde, county of Chester, and William Mather, of Salford, county of Lancaster, England, have patented machinery for washing fabrics, which consists in certain combinations of machinery, whereby the fabrics in a distended state are continuously lifted out of and immersed in the water, soap liquor, or other liquid, while passing through the machine, so as to obtain a dashing action, which will effectually cleanse the piece while extended to its full width and without undue tension, thus obviating the necessity of washing pieces that are printed with colour in the form of a rope, as at present.

Glove-sewing Machine has been patented by Mr. Claude M. Boland, of New York city. This invention relates to that class of machines for sewing gloves and furs in which are employed two parallel feed disks, a reciprocating needle, and an oscillating looper; and it consists in an arrangement of parts which cannot be clearly described without engravings.

Improved Buckle has been patented by Mr. N. L. Anderson, of Sioux Falls, Dakota Ter. The invention consists of a curved, looked, and barred frame, through which the trace is designed to pass, having a vertical stud projecting from the upper edge of the rear bar and designed to enter the trace, and, in combination therewith, of a tongueless barred and curved frame designed to be secured in the hame tug, locking with the tongue frame in such a manner that a strain upon either trace or tug will apply a corresponding pressure to compress the trace between the tougue bar of the frame and the cross bar of the other frame.

Improved Shoulder Pad has been patented by M. Isaac N. Stern, of New York city. This invention consists in a hollow segment-shaped pad, made of some air-tight material, such as rubber or oiled skin, which pad is inflated and placed between the cloth of the coat and its lining at the joint of the sleeve and shoulder.

Improved Stop for Oil Can Spouts, which allows for inlet of air when oil is poured from the can, has been patented by Messrs. Winfield S. Ricker and Robert H. M. Barker, of Cambridgeport, Mass. The invention consists in a spring finger lever provided with disks covering the neck and spout of the can, and fitted so that they may be simultaneously opened by pressing the lever, to permit of the oil being poured out and to admit air into the can, the lever being also adapted to be moved aside to open the neck for filling.

Condenser.—Mr. John D. Brooks, of Jersey City, N. J., has patented a surface condenser, more particularly for marine engines, which provides large condensing surface in a small space. It is constructed with a series of narrow steam condensing spaces of annular corrugated form in cross section with intervening cold water spaces of similar form.

Grinding Machine.—Mr. George B. Stetson, of New Bedford, Mass., has patented a twist drill grinding machine. The invention consists of a sliding head adjustable on a suitable standard, so as to be moved toward or from the grinding wheel, and supporting a horizontally swinging bed, on which is mounted a chuck or jaws for holding the drills to the ground, and supporting also a sliding plate or fulcrum, a system of levers, connecting the same with the chuck or jaws, whereby the latter may be vertically adjusted. And it consists, further, of a stop and a drill guide attached to the chuck, and of novel arrangements of grinding wheels and other ports of the machine.

Pump.—Mr. Samuel H. Bakewell, of Lansing, Iowa, has patented a pump which reduces the comparative pressure of the water on the piston, and the power required to work the pump, and which throws water both during the ascent and descent of the piston.

Plough.—Mr. Edward A. Eustice, of Greenvale, Ill., has patented a sulky plough so constructed that it can turn a square corner and can be readily adjusted to deep or shallow furrows. As the team starts forward in a new direction the plow is turned at right angles or at the angle which the new direction makes with the former direction, and at once begins to cut a furrow, no ground being left unploughed and no wide space being required for turning the machine. The machine is turned by the draught applied to the draw-rod (each horse drawing his own share) instead of the side pressure upon the tongue.

Car Brakes of that type which automatically apply the brakes through the movement of the draw-bar, have been patented by Mr. Henry Gallager, of Savannah, Ga. The improvements contemplate the constant pressure of the brakes upon the wheels whenever the draw-bar is in its normal position of rest, and which brakes are released or withdrawn from the wheels whenever the draught strain pulls the draw-bar out, or whenever the draw-bars are driven in by backing, so that whenever the locomotive approaches a condition of rest, whether in moving forward or backward, the brakes commence to be applied automatically, but are not applied when the power of the locomotive is being transmitted to the cars for transportation.

Electric Clocks.—Mr. Augustin Personne, of Paris, France, has patented an improvement in that class of electric clocks in which an electro-magnet is used to automatically give an impulse to the pendulum of the clock every time its oscillation decreases below a certain amplitude. For this purpose the electric current is, when necessary, sent through the coils of the magnet by means of a device mounted upon the pendulum, and having a differential motion caused and controlled by the resistance opposed to it by the air during its oscillation.

A Safety Lamp has been patented by Mr. Mark A. Heath, of Providence, R. I. It has a chamber containing carbonic acid gas, which escapes when the lamp is broken, the intention being that the gas shall extinguish the flame.

Hydraulic Air Compressor.—Mr. William R. Freeman, of San Antonio, Texas, has patented the above. The compressing cylinder being filled with air or gas, as the case may be, the air inlet is closed, as is also the waste water cock. The water supply cock is opened, allowing the water to rise in the cylinder, compressing the air or gas therein to a tension equal to the water pressure, and indicated by the pressure gauge. Communication being then opened by means of the three-way cock between the compressing cylinder and the nozzle, the air is allowed to pass to the place of storage or use. The air cock is then turned to communicate with the outer air or gas supply, the water cock is closed, and the waste cock opened allowing the water to escape from the compressing cylinder, which at the same time becomes filled with air or gas, and the operation repeated.

Strawberry Car.—Mr. Alvin H. Fogg, of Rockland, Me., has patented a strawberry car, designed for use in cultivating and gathering strawberries, cranberries, and in weeding and thinning out all kinds of root plants.

Improved Incubator.—An improved incubator, which regulates its temperature and shifts the eggs antomatically at regular intervals, is described with illustrations in the *Scientific American.* We cannot present our readers with engravings, but being impressed with the importance of the invention place the following statement before our readers. It is provided with a series of longitudinal cloth hammocks or egg receivers, attached to end pieces pivoted to rigid supports and to movable bars, which are automatically moved so as to shift the eggs at regular intervals by suitable levers controlled by clock-work. The gas or oil cock of the flame of the boiler for heating the incubator is controlled by means of a pair of electro-magnets, connected with a battery, and with a metal thermometer provided with an adjustable scale so that the temperature of the incubator is regulated automatically. The box is constructed with rabbeted corner posts and a double casing, the space between being filled in with non-conducting material. The box is also provided with a shelf, upon which the boiler and automatic regulating devices rest. The boiler is provided with the pipes for conducting steam to and from the heating tubes circulating in the box, and arranged in such a manner as to gradually pitch back to the boiler. The boiler has a tube for filling it, also a water gauge and a safety valve, and is heated by means of a flame of gas or of an oil lamp provided with an Argand burner. When oil is used, an oil tank connected with the burner by a tube is placed on the shelf. It is of the greatest importance to maintain a uniform heat in the incubator, and mechanism is provided which automatically regulates the temperature. A spiral metal thermometer, of well known construction, is attached at one end to a binding screw, fastened to the ceiling of the box, and connected with the battery by a wire, and the other end of the thermometer is attached to an index pivoted in the centre of a curved scale at the side of the incubator, which can be adjusted by means of a journalled endless screw. The index is provided with rectangular arms, which are hinged in such a manner that they can only bend upward, and can never form less than a right angle with the hand, so that if the thermometer continues to rotate the needle or hand, after the ends of the arms rest on the end pieces of the scale, the arms will not break, but will incline at the joint or hinge. By means of the endless screw the scale, and consequently the thermometer, can be made to correspond with the mercury thermometer at the top of the incubator. The end pieces of the circular scale are connected with the electro-magnets by the wires, and the magnets are in turn connected with the battery. The armature of the magnets is attached to a spring which holds it in a central position in relation to the two magnets. This mechanism controls the gearing, which operates a horizontal shaft driven by clockwork and acting upon the burner. The eggs are placed in longitudinal hammocks or receivers, made of canvas, attached to bars which are fastened to end pieces, which are pivoted to fixed bars and to movable bars. The movable bars are acted upon by the works of the clock, which are constructed similar to the striking mechanism of an ordinary clock, so that the receivers are moved at regular intervals. The eggs having been placed into the hammocks, the metal thermometer is regulated and adjusted according to the liquid thermometer. If the flame of the burner under the boiler is too large, too much steam will be generated and the air in the box will become overheated. The thermoter expands, and, moving the index, the electric circuit is closed, operating the mechanism which turns down the flame of the burner. If the air in the box is too cold the above operation is repeated, but all parts move in the inverse direction, and in this manner the temperature can be controlled automatically. If desired, alarm bells may be arranged to ring when the temperature rises too high or falls too low. Shallow vessels containing water will be placed above the steam tubes for the purpose of supplying the air in the incubator with the necessary quantity of moisture. This invention was lately patented by Messrs. Chas. L. and Henry S. La Barge, 22, Nicholson Place, St. Louis, Mo.

Force Pump.—Mr. Ambrose Mathews, of Kewanee, Ill., has patented a force pump. A stem valve and spring-actuated hollow plunger, or piston, working in a close-bottomed cylinder, is so arranged that on the up stroke the valve lifts above the piston, and admits water to enter the top of the cylinder and flow into and below the piston, while on the down stroke the valves close down in the top of the piston, so that they act together as a solid piston in forcing water.

Spring Bed.—Mr. Andrew J. Curtis, of Monroe, Me., has patented an improved spring bed, having rows of upright spiral springs whose enlarged tops are connected with each other and the enclosing bed frame by rings and braces in such a manner that they can move only in a perpendicular line, so that when compressed the spirals of the springs will not come in contact with each other, said springs having their upper ends firmly and unyieldingly secured to their bodies to prevent their lateral contraction and expansion.

A Car Door Latch has been patented by Messrs. W. McCombie and T. J. Morgan, of Chicago, Ill. The object of this invention is to construct a lock, especially designed for cars, that is easy of repair, of superior durability, and that can be attached to a car door in less time than other locks in use.

Fruit Utilisation.—Mr. Jonathan C. Deuel, of Reynale's Basin, N.Y., has patented an improved apparatus for bleaching fruit. The object of this invention is to set the original colour of the fruit and vegetables, such as apples, pears, peaches, potatoes, &c., or bleach them immediately after they are sliced, so that they will not afterwards, in the drying process or manipulation, become discoloured by exposure to the air and light. The invention consists of an improved fumigator designed especially for the convenient reception, exposure to the sulphur fumes, and removal of the fruit or vegetables, and for a continuous automatic supply of sulphur, and to prevent the escape of the fumes to annoy the operators.

A Seed Sower has been patented by Mr. Mason Gibbs, of Homer, Mich. The object of this invention is to furnish seed sowers for sowing clover seed, timothy seed, and other fine seeds. It is so constructed as to sow the seed uniformly, and it can be readily adjusted to sow any desired quantity of seed to the acre.

A Car Truck has been patented by Mr. Franklin Beaumont, junr., of San Antonio, Texas. The improvement consists in providing the lateral guide wheels with long axles which are inclined at an angle of about 45 degrees to the axles of the ordinary truck wheels, and in providing the bolsters of the truck with a central opening, and otherwise constructing it with a view to attachment of such inclined axles.

A Mill for reducing grain has been patented by Mr. Edward L. Baker, of Red Wing, Minn. This invention is designed to accomplish the disintegrating of grain in milling as is now usually done on grooved iron rolls by a mill or machine applicable to all old style mills without change in their construction, adapting them with little expense from low grinding to high grinding, or Hungarian mills, thereby increasing their capacity and usefulness. It is designed, also, to make the best quality of flour while making the greatest possible amount of middlings in disintegrating grain, and to be applied in and take the place of the ordinary French burr stone now in use.

A Bucket for chain pumps has been patented by Mr. Stephen F. Lockwood, of Stapleton, N.Y. It consists of the conical elastic disk having a flat top, straight inclined sides, and a circular recess in its lower face, the line of greatest circumference of the bucket being below the top of the recess.

Washing machine.—Mr. Willis Carter, of Nanaimo, British Columbia, has patented an improved washing machine having two curved roller washboards, one fixed and the other pivoted at the bottom, and a rubber on the end of a pivoted bar arranged to vibrate between the washboards.

Shaft coupling has been patented by Mr. Charles E. Marston, of Dover, N.H. It consists of two semi-cylindrical blocks longitudinally grooved in their flat faces, and having midway in their grooves rectangular or flat seats that serve to hold the correspondingly flattened and shouldered ends of the coupled shafts. Interiorly tapering locking rings fit over the correspondingly tapering ends of the blocks to hold the latter together, and are held and adjusted in place by screws.

An improved muff has been patented by Alice Pass, of New York city. The invention consists in making a satchel muff with a gathered satchel opening upon the top, and with hand apertures below, arranged at right angles with the satchel opening. The outside off the muff is provided with a pocket.

Mr. P. A. O'Malley, of Brooklyn, N.Y., has patented a *package fastener* which facilitates the tying and untying of packages of mail matter and other materials. In this invention a flat plate is provided, to one end of which the tying cord is attached. The face of the plate is provided with fastening pins and a pivoted clamp, the arrangement of the parts being such that in tying a package the plate is laid upon the package, and the cord then passed around it, then under the head of a fastening pin on the plate, then around the package in a contrary direction, the extremity of the cord being then fastened on the plate by means of the pivoted clamp. We are informed that this invention has been used with great satisfaction in the City Delivery Department of the New York Post Office.

Musical Box.—Mr. Daniel Aubert, of Sainte Croix, Switzerland, has patented an improved musical box. This invention relates to mechanism for musical boxes to increase the time of working, and admit of their being placed in a clock case in connection with a clock, for example, only to be wound up every eight days, at the same time as the clock is wound.

Improved rotary registering measure for linear measurements has been patented by Mr. Lewis W. Brown, of Osage City, Kan. The invention consists of a circular case or frame containing a unit and a tens wheel of equal diameters, provided with suitable figures on their rims, and holding between them a pinion, which is attached to the handle of the device, and of a larger circumferentially toothed wheel secured upon the hub of the unit wheel that they may revolve together, so that as the device is moved over the face of an object the larger wheel is made to revolve and turn the unit wheel once in each revolution. while at each revolution the unit wheel causes the tens wheel to move through a tenth of a circle, both the unit and tens wheels presenting, as they revolve, figures that indicate the measurements of the object over which they have been moved.

Horse Detacher.—Mr. George W. Healey, of Jackson, Mo., has patented an improved horse detacher. The invention consists of a forward curved stud inserted in each end of a singletree to receive the rear ends of the traces, of springs secured on the face of a singletree and bending down in contact with the studs to prevent the traces from accidentally slipping off, and of a wire or rod connecting the springs, by which the springs are raised from the studs so that the traces may become disengaged.

Mosquito-netting frame for bedsteads, which is simple, light, durable, and convenient, has been patented by Mr. Alfred H. Bailey, of Palestine, Texas. The invention consists of a mosquito netting frame formed of two longitudinal rods fastened to uprights attached to the bedposts, and held by cords or wires passing from the outer ends of each of the rods to the top of each upright.

TURTLES.

One is not quite sure in these days of civic disparagement whether there is sufficient interest existent amongst mankind to desire information on the subject of edible turtles, yet as lovers of calipash and calipee are still living, we venture to present our readers with the following article on the subject, extracted from the *Journal of Applied Science*.

The painted turtle (Chrysemys picta, Henma and Gray) may be found in many of the American ponds, lakes, creeks, and rivers from New Brunswick to Georgia. Though not considered eatable, it is nevertheless sold along with several other tortoises, and figures as a "diamond-back" in the famous terrapin supper. Indeed in some seasons there are more wood turtles (Chelopus insculptus, Le Conte) and red-bellied turtles Pseudemys rugosa, Shaw) sold in the Philadelphia markets than edible salt water terrapins or diamond-backs (Malacoclemmys palustris, Gmel., Gray.) In examining a netful of terrapins at a game store a short time ago, all of them were of the rugosa species. Many of them were dead, and two were so "very dead" that their eyes had dried up and sunk deeply into their sockets. And yet the wily caterer will buy them and stew them with wine and spices, and the epicure will smack his lips over this reptilian carrion, and exclaim, "How delicious!"

Emys tecta. Gray, abounds in the Hooghly and is sold for food.

The flesh of an Emys is eaten in China, and is considered medicinally pectoral and emollient. The shell cut up in small pieces is given in decoction. The carapace is, however, carefully examined to observe if there are nine divisions or markings at the sides, for if so, its value is great. It is boiled in vinegar and water to form a jelly, much prescribed in rheumatism, debility, and other disorders. The flesh of the hairy tortoise is considered excellent in many maladies.

The flesh of the matamata terrapin (Chelys matamata, Brug.) is highly esteemed, and in Cayenne and Guiana incessant warfare has been maintained against it, so that it has become scarce.

The flesh of the tailed tortoise of North America (Chelydra serpentina, Schweig.), and of the alligator snapper, (Machrochelys laxiutina, Schw.), is considered unpalatable and has musky odour. That of the fringed snouted tortoise (Chelys fimbriata), is, however, excellent eating.

To the family of Testudo belongs the jaboty (Testudo carbonaria, Spix.), an exclusively terrestrial species, the flesh of which is much esteemed as delicate food, and it rivals in flavour that of the Podocnemis expansa. The flesh fried is considered one of the best meats met with.

The large greaved tortoises (Podocnemis expansa) are extremely numerous in the northern rivers of South America. The eggs are large, spherical, and white, and form an important part of the diet of the Indians. They dry these eggs by placing them on boards in the smoke to a fire. Bates, when travelling on the Amazon, had to live for a considerable part of the year on this tortoise. It was the only animal food, except fish, which was to be had; and although all the arts of the native cuisine were employed, he got thoroughly tired of it.

The flesh of many of the mud or soft tortoises (Trionycides) is very nice. One species (Crytopus granosus, Ribr.), found living in fresh water in Southern India, forms an article of diet.

Sea Tortoises.—We come now to the marine turtles, and of these, in commencing his notice of them, M. Lacepede well remarks:—One of the best presents which nature has given to the inhabitants of equatorial countries, one of the most useful products which it has deposited on the confines of land and water, is the turtle. Of these we may notice the green turtle, the loggerhead or hawk-bill turtle (Cheloue imbricata, Schweig), furnishing the tortoise-shell of commerce, and the luth or leathery turtle (Sphargis coriacea, Rondelet).

The flesh of some species of marine tortoises, but particularly of the green turtle (Chelonia Mydas, and C. virgata, Schw.), is in the greatest request as a luxury for the table, at least in England, and the animal itself is an object of commerce. The arrival of a cargo of "lively turtles" is by no means a thing of trifling importance. Of late years the flesh is imported dried, which has placed it within the reach of general consumers. The flesh is also salted in some quarters. All the turtles afford a considerable quantity of oil, which is employed for various purposes. In some of the West Indian islands, it supplies, when fresh, the place of butter or salad oil for culinary purposes, and it is also used for burning in lamps.

Turtle would seem to have been first introduced in England as an article of food about the eighteenth century. for a record in the "Gentleman's Magazine," under date August 31, 1753, shows that it was then a rarity; and they did not know how to dress it. It states:—"A turtle, weighing 350 pounds was ate at the 'King's Arms,' Pall Mall; the mouth of an oven was taken down to admit the part to be baked."

Mode of Purifying Oils.—Oils in their natural state are always more or less impure, and some of them so viscous as to be quite inapplicable to the lubrication of machinery, or to illuminating purposes, without previous purification. The impurities consist, for the most part, of albuminous, mucous, gelatinous, and colouring matters. A great part of the mucilaginous matters, and all bodies merely in a state of suspension, are deposited by repose for a short time; but, in order to clarify the oil, it is necessary to employ other means. The method most generally adopted is that suggested by Thenard. Sulphuric acid, for example, in the proportion of 1 and 2 per cent. of the oil, acts as a purifying agent, precipitating the mucilage and parenchymatous matters: first, by its powerful dehydrating action, it removes the water by which the substances were held in solution in the oil, and afterward chars the mucous matters themselves, thus rendering them insoluble, or otherwise effecting their destruction. The oil itself is, to a small extent, acted upon. It becomes green or dark brown, and after some time yields a deposit of the some colour, becoming itself bright and clear. Thenard's purifying process, as improved by Cogan, is conducted as follows:—The oil is heated 212° Fah. by steam in a copper pay. When sufficiently hot, from 1 to 2 per cent. of sulphuric acid is gradually poured in, with constant and violent agitation. As the action of the acid depends more or less upon the amount of contact between the two liquids as well as upon the degree of heat, Cogan's improvement consists in blowing steam through the mixture. In five or ten minutes the action will be complete, and after twenty-four hours' repose, the oil will be almost entirely freed from acid, and the black feculent dregs will subside, leaving the supernatant oil quite clear and greatly improved in colour. For one hundred gallons, ten pounds of sulphuric acid are required, diluted with an equal bulk of water. After standing for twelve hours, the black watery acid liquor is withdrawn, by opening a stop cock at the bottom of the pan. The clear and limpid oil is then drawn off by opening a tap in the side, and what remains below this tap is turbid, and this, being let out into a reservoir, is either clarified by substance, or mixed with the next portion of raw oil.

American and French Silks Contrasted.—Foreign correspondents complain very much of the miserable quality of the silks and satins from the Lyons looms; that, as they scarcely outlast half a dozen wearings, plush, brocade, and Sicilienne take their place. This emanates from France, but the English have for several years previously acknowledged the superiority of the American silks, brocades, damasses, and armures, as well as gros-grains, which are free from all injurious matter, and will neither crack nor fray, but outwear several French silks. Another great defect in black silk is "wearing shiny," which comes from the action of the soap and alkali developing a grease under friction. Cracking arises from the strain of the delicate silk to carry the heavy load of iron, potash, logwood, soda, oil, soap, and other chemicals used in foreign treatment. Raveling a thread from the silk, passing it through, and straining it over the fingers, is a good test. In heavily dyed silks the thread will feel rough and lumpy, and if a small quantity be burned it will simply smoulder, leaving a yellow, greasy look, while if pure it will immediately be consumed to a crisp, leaving only a pure charcoal. A new feature in silk trade has been the importation of raw silk from Asia through the Suez Canal and the Mediterranean direct to New York, though the greater part of the Asiatic importation of silk comes across the Pacific Ocean, and is brought here by rail.—*N. Y. Tribune.*

An Old Inventor.—At the Great Exhibition of 1851 a prize medal was awarded for an ingenious little machine which printed in several colours, and checked with the greatest accuracy the issue of railway tickets, theatre tickets, and the like, and two years previously, at the French National Exhibition of 1849 in Paris, the inventor, Mr. J. J. Baranowski, had obtained celebrity by showing various machines, amongst which was a so-called "taxe-machine" for checking accounts. He then invented some automatic railway signals, which were sufficiently appreciated by the engineering world to secure their use in France on the Paris and Rouen and Paris and Strasburg lines; in England on the North London between Hackney and Kingsland; and in Italy on the main line between Turin and Genoa. But all these inventions were eclipsed and neglected to make time for developing his financial scheme for the subscription of the loan of five milliards imposed upon France at the close of the war with Germany. For this latter project his previous experience as second secretary of the National Bank of Poland and officer of a large banking establishment in Paris especially fitted him, and it was so highly appreciated by the Finance Minister of the day, Mr. Pouyer-Quertier, that Mr. Baranowski received an autograph letter of thanks, and his plan was adopted, with the sole modification—made to meet the views of the bankers—in issuing it as 5 per cent. perpetual Rentes instead of 3 per cent. terminable in 30 years, which it is now generally acknowledged would have been more advantageous to France. The enormous success of both issues of the loan in question is a matter of history. Receiving no recompense from the French Government Mr. Baranowski came to London, and is now, at 75 years of age, under secretary to the Literary Society of the Friends of Poland, of which country he is a native. His "Vade Mecum de la Langue Française" (London: Trübner and Co., Ludgate Hill) was noticed some time since in the *Mining Journal*, and he has now just completed an Anglo-Polish Lexicon, embracing a grammar, dictionary, and dialogue book in a single vest pocket volume. He claims that by its aid the student may learn to speak the melodious language of Poland without a master, and a glance at a few sheets of the manuscript leaves no doubt that his claim will be fully justified.—*Mining Journal.*